Augmented ST-Segment Elevation during Recovery from Exercise Predicts Cardiac Events in Patients with Brugada Syndrome

Hisaki Makimoto1, Eiichiro Nakagawa1, Hiroshi Takaki1, Yuko Yamada1, Hideo Okamura1, Takashi Noda1, Kazuhiro Satomi1, Kazuhiro Suyama1, Naohiko Aihara1, Takashi Kurita3, Shiro Kamakura1, Wataru Shimizu1

1Division of Arrhythmia and Electrophysiology, Department of Cardiovascular Medicine, National Cerebral and Cardiovascular Center, Japan, 2Department of Cardiology, Osaka City General Hospital, 3Division of Cardiology, Department of Internal Medicine, Kinki University School of Medicine

Objectives: The goal of this study was to evaluate the prevalence and the clinical significance of ST-segment elevation during recovery from exercise testing.

Background: During recovery from exercise testing, ST-segment elevation is reported in some patients with Brugada syndrome (BrS).

Methods: Treadmill exercise testing was conducted for 93 patients (91 men), 46 ± 14 years of age, with BrS (22 documented ventricular fibrillation, 35 syncope alone, and 36 asymptomatic), and for 102 healthy control subjects (97 men), 46 ± 17 years of age. Patients were routinely followed up. The clinical end point was defined as the occurrence of sudden cardiac death, ventricular fibrillation, or sustained ventricular tachyarrhythmia.

Results: Augmentation of ST-segment elevation ≥0.05 mV in V1 to V3 leads compared with baseline was observed at early recovery (1 to 4 min at recovery) in 34 BrS patients (37% [group 1]), but was not observed in the remaining 59 BrS patients (63% [group 2]) or in the 102 control subjects. During 76 ± 38 months of follow-up, ventricular fibrillation occurred more frequently in group 1 (15 of 34, 44%) than in group 2 (10 of 59, 17%; p = 0.004). Multivariate Cox regression analysis showed that in addition to previous episodes of ventricular fibrillation (p = 0.005), augmentation of ST-segment elevation at early recovery was a significant and independent predictor for cardiac events (p = 0.007), especially among patients with syncope alone (6 of 12 [50%] in group 1 vs. 3 of 23 [13%] in group 2) and among asymptomatic patients (3 of 15 [20%] in group 1 vs. 0 of 21 [0%] in group 2).

Conclusions: Augmentation of ST-segment elevation during recovery from exercise testing was specific in patients with BrS, and can be a predictor of poor prognosis, especially for patients with syncope alone and for asymptomatic patients.

Keyword: Brugada syndrome